

PATENT COOPERATION TREATY
PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

REC'D 18 OCT 2005

CONFIDENTIAL

Applicant's or agent's file reference P12/Lai/Yan	FOR FURTHER ACTION		See Form PCT/IPEA/416
International application No. PCT/SG2004/000178	International filing date (<i>day/month/year</i>) 10 June 2004	Priority date (<i>day/month/year</i>) 10 June 2003	
International Patent Classification (IPC) or national classification and IPC Int. Cl. ⁷ A46B 7/04			
Applicant LAI, Joo Koi et al			

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 4 sheets, including this cover sheet.

3. This report is also accompanied by ANNEXES, comprising:

a. ☒ (*sent to the applicant and to the International Bureau*) a total of ~~11~~ ¹¹ sheets, as follows:

☐ sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).

☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.

b. ☐ (*sent to the International Bureau only*) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or table related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

4. This report contains indications relating to the following items:

<input checked="" type="checkbox"/> Box No. I	Basis of the report
<input type="checkbox"/> Box No. II	Priority
<input type="checkbox"/> Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
<input type="checkbox"/> Box No. IV	Lack of unity of invention
<input checked="" type="checkbox"/> Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
<input type="checkbox"/> Box No. VI	Certain documents cited
<input type="checkbox"/> Box No. VII	Certain defects in the international application
<input checked="" type="checkbox"/> Box No. VIII	Certain observations on the international application

Date of submission of the demand 6 January 2005	Date of completion of the report 4 October 2005
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INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/SG2004/000178

Box No. I Basis of the report

1. With regard to the language, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ This report is based on translations from the original language into the following language which is the language of a translation furnished for the purposes of:

☐ international search (under Rules 12.3 and 23.1 (b))

☐ publication of the international application (under Rule 12.4)

☐ international preliminary examination (under Rules 55.2 and/or 55.3)

2. With regard to the elements of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

☐ the international application as originally filed/furnished

☒ the description:

pages as originally filed/furnished

pages* 1-8 received by this Authority on 13/9/05 with the letter of 13/9/05

pages* received by this Authority on with the letter of

☒ the claims:

pages as originally filed/furnished

pages* as amended (together with any statement) under Article 19

pages* 9-11 received by this Authority on 13/9/05 with the letter of 13/9/05

pages* received by this Authority on with the letter of

☒ the drawings:

pages 1/7-7/7 as originally filed/furnished

pages* received by this Authority on with the letter of

pages* received by this Authority on with the letter of

☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing.

3. ☐ The amendments have resulted in the cancellation of:

☐ the description, pages

☐ the claims, Nos.

☐ the drawings, sheets/figs

☐ the sequence listing (*specify*):

☐ any table(s) related to the sequence listing (*specify*):

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

☐ the description, pages

☐ the claims, Nos.

☐ the drawings, sheets/figs

☐ the sequence listing (*specify*):

☐ any table(s) related to the sequence listing (*specify*):

* If item 4 applies, some or all of those sheets may be marked "superseded."

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/SG2004/000178**Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement****1. Statement**

Novelty (N)	Claims 1-16	YES
	Claims --	NO
Inventive step (IS)	Claims 1-16	YES
	Claims --	NO
Industrial applicability (IA)	Claims 1-16	YES
	Claims --	NO

2. Citations and explanations (Rule 70.7)

The invention of the claims is a toothbrush having a head which may be engaged and disengaged from an elongated handle. The head has an elastic casing with an opening into which the handle head is inserted for engagement and secured by locking means of a pin and through hole into which the pin securely fits after the handle has been fully inserted.

The citations do not disclose such a toothbrush.

The closest art is US 2003/0046780 where there is no pin and through hole locking device.

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/SG2004/000178

Box No. VIII **Certain observations on the international application**

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

1. Claim 1 is not supported in the description on what is described in the specification because there is no disclosure of more than one through hole providing access into the casing for the handle head.
2. Claim 1 is not clear as to whether the through of line 12, which appears to be part of the locking means, is the same as the through hole of lines 7-8, which appears to be part of the access to the casing for the handle head.

Toothbrush**CONFIRMATION****Field of Invention**

- 5 The toothbrush described herein relates to changeable or disposable brush heads and locking means for securing such brush heads to the toothbrush handle.

Background of the Invention

- 10 Teeth brushing has been improved on either in the formulation of toothpaste or the brush that is used. Some of these improvements are also expanded in scope to benefit the gum as well.

The present invention is a toothbrush contributing to improvements in teeth brushing which is an indispensable hygiene care. Its main feature is that it is a toothbrush with a detachable
15 brush head. This allows the user to choose from a variety of pad design with different bristles configuration to suit the user's brushing needs. Besides the variety of brush head to choose from, the handle comes in different shapes that are ergonomically designed. This allows the user to mix and match the brush head with the handle not only to suit his or her brushing needs but also to have a toothbrush that is comfortable to use.

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Since the brush head is interchangeable, only the brush head needs to be disposed off while the handle may be retained. This cuts down a high percentage of waste material contributed from thrown away toothbrush and makes this toothbrush environmental friendly.

- 25 The toothbrush is also simultaneously meant to be gum friendly since the bulk of its modular brush head is made of soft elastomeric material. It not only absorb the impact of the brush head knocking on to the gum but the back and the side of the brush head which is made of this soft yet elastic material can be used a gum massager, thus extending the function of this invention.

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Therefore, it is the general objective of the invention to provide effective teeth brushing using a toothbrush which is user-friendly and environmental friendly. This is achieved by providing a means to change the brush head or the handle of the invention.

It is furthermore the objective of the invention to provide a means for changing the brush head or the handle of a toothbrush.

Specifically such a brush head is not only securely held to its handle but it also securely
5 locked in place through a locking means, which said locking means is preferably applied without need of tools.

It is also intended that said locking means allows the brush head to be removed easily from the handle at user's will but not when the toothbrush is in used.

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It is also the intention of the invention to gum-friendly as part of its user-friendly feature, with the brush head acting as a gum massager as well.

The invention also allows permanent drawings to be imprinted, formed or molded onto the
15 brush head as desired.

The locking means to lock the brush head to its handle can also be incorporated in electrical toothbrush after suitable modifications.

20 **Summary of the Invention**

The invention is a toothbrush that is made up of a brush head engaged on to an elongated handle. The modularity of the brush head and elongated handle allows the user to mix and match brush heads with different bristle configurations and elongated handles with different
25 designs to suit individual brushing needs. The brush head has a casing disposed on the reverse side of the bristles. The casing is partially or fully elastic in order that the handle head may be inserted entirely into the brush head. The brush head may further include locking means using extended pins and corresponding holes which may have more than one embodiment. Since the casing is partially or fully elastic, it is softer than that of other
30 toothbrushes and hence may be used as a gum massager. Worn out brush heads can be disengaged for disposal, making this invention environmental friendly. The brush head may also be incorporated into an electrical toothbrush.

Brief Description of the Drawings

Figure 1 shows the entire toothbrush in one of its embodiment.

- 5 Figure 2a and 2b shows the top view and side view of first embodiment of the elongated handle.

Figure 3a and 3b shows the top view and side view of second embodiment of the elongated handle.

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Figure 4a and 4b shows the top view and side view of third embodiment of the elongated handle.

Figure 5 shows the cross-section view of the first and second embodiment of the brush head.

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Figure 6 shows the cross-section view of the third embodiment of the brush head.

Figure 7 shows the cross-section view of the fourth embodiment of the brush head.

- 20 Figure 8 shows the cross-section view of part of the toothbrush.

Figure 9 shows the first embodiment of the locking means.

Figure 10 shows the second embodiment of the locking means.

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Detail Description of the Preferred Embodiments

The entire invention (000) in one of its embodiments is exemplified in Fig. 1. It is composed of two main parts: a brush head (200), and an elongated handle (100). The handle grip (102) is disposed at the first end (101) of the handle (100), which is joined to a handle head (110) at the second end (104) of the handle (100) by means of a neck (103), as shown in figure 2a and 2b. The shape of the neck (103) is preferably as follows. The neck (103) looks like an elongated "S", like the shape of a human spine - or cubic spline shape - when the toothbrush is viewed from the side. When viewed from the top, from the end of the bristles (202), the

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neck (103) tapers off to a minimum cross section and slightly widens again as it extends up from the handle grip (101) toward the handle head (110) as shown in figure 2a. However, this does not mean that the cross-section of the neck (103) is smaller than the width of the handle head (110) to be described below. The cross-sectional area of the neck (103) may be of any size in relation to the width of the handle head (110).

The first end (111) of the handle head (110) is preferably wider than the adjacent portion (103') of the neck (103) that is joined to it. As the first end (111) of the handle head (110) extends toward the second end (113) of the handle head (110), the middle section (112) has the same width as the second end (113) of the handle head (110). The second end (113) of the handle head (110) that is joined to the middle section (112) is streamlined so that the handle head (110) can be easily inserted into brush head (200), to be exemplified later. When viewed from the side the entire brush head (100) is preferably flat as shown in figure 2b, except where there may be extended pins which will be described later.

The handle may have still another second embodiment as shown in figure 3a and 3b wherein the neck (103a) is inclinely molded at an angle (105) to one side when viewed from the top as shown in figure 3a. In the third embodiment as shown in figure 4a and 4b, the neck (103b) is inclinely molded in such a manner that the curve (106) of the elongated "S" that is nearer to the handle head (110) will have a smaller curvature. As a result, the elongated "S" will not be as elongated as before but curved in more toward the top side of the toothbrush as seen from the side of the toothbrush as shown in figure 4b. The necks (103, 103a, 103b) have various types of inclination at different angles to cater for the different brushing needs of different users. It is clear that these examples (Fig 2a, 2b, 3a, 3b, 4a, 4b) of the elongated handle are by no means exhaustive. Furthermore different shapes of handle head (110) can be incorporated with necks having different curvature to obtain other embodiments.

Meanwhile the general construction of the brush head (200) as shown in figure 8, is composed of a casing (203) disposed on top (201a) of a bristle pad (201). This can be achieved by using either insert molding, over molding or other existing production method in the art. The bristle pad (201) is preferably rigid, made of material such as polypropylene resin or other resins or modified elastomeric materials which are not elastic but resilient and slightly stiffer that is suitable for planting or tufting arrays of bristles (202). The bottom side (201b) of the bristle pad (201) is planted or tufted with arrays of bristles (202). Bristles (202)

of any material, height, design and configuration of bristles can be mounted on the bristle pad (201). The casing (203) can be partly or entirely made of soft materials, such as another kind of elastomeric material which is elastic and soft towards user's gum. Various specific embodiments of such a brush head (200) will be given as follows.

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In a first embodiment of the brush head (200) as shown in figure 5, the minimal construction of the casing (203) has a bristle pad (201), opposing side walls (205a, 205b) and a base portion (204). The opposing side walls (205a, 205b) are molded along both opposing sides of the bristle pad (201) and the base portion (204) joins the side walls (205a, 205b) together to form a passage way (206). In this embodiment, minimally the base portion (204) is made of said soft material which is elastic. In a second embodiment modified from the first embodiment, the side walls (205a, 205b) can also be made of same soft material. In a third embodiment modified from the second embodiment as shown in figure 6, the second end (207) of the brush head (200) can be closed up by a second end wall (207a) which may be or may not be made of the soft material. However, the second end wall (207a) is preferably made of the soft material since the invention is meant to be gum-friendly. In the first two embodiments, the brush head (200) is engaged onto the handle head (110) by simply inserting the handle head (110) into the passage way (206) through an access (210a) at first end (210) of the brush head (200) as shown in figure 6.

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In the fourth embodiment of the brush head (200) as shown in figure 7, the first end (210) of the brush head (200) can be closed up by a first end wall (209) made of similar soft material which has an opening (209a) on it. Preferably, this opening (209a) matches the cross-section of that portion (103') of the neck (103) that will go through it when the handle head (110) is inserted into the brush head (200). However, the invention (000) still works with different sizes of the opening (209a) or the access (210a).

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As exemplified earlier, a major part of the handle head (110) is equivalent or wider than the neck (103) except for the second end (104) of the handle head (110). The handle head (110) is thicker or equivalent in height to the passage way (206). This necessitates that different parts of or the entire casing (203) be made with soft material that are elastic. For instance, the fourth embodiment of the brush head (200) as shown in figure 7 may be modified to have only the first end wall (209) and base portion (204) be made of elastic materials; or the first end wall (209) and the second end wall (207a) and side walls (205a, 205b) be made of elastic

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materials, while the rest are rigid materials. These combinations of elastic and rigid materials in the fourth embodiment of the brush head (200) as shown in figure 7 allows the larger handle head (110) to be pushed through a smaller or same size opening (209a) and the entire casing (203) to enclose the handle head (110) once it is inside the cavity (203a) of the casing (203). When the handle head (110) is pushed through the opening (209a), the first end wall (209) will be stretched so that the opening (209a) becomes wider. Due to the elasticity of the wall, the opening (209a) will be restored to its original size once the entire handle head (110) is inserted into the brush head (200).

- 10 The bristle pad (201) may be entirely rigid or must at least be semi-rigid so that bristles (202) may be mounted on it. Therefore in principle, the invention is a brush head (200) that can be engaged on to the handle head (110) of an elongated handle (100) by means of inserting the handle head (110) into a casing (203) of the brush head (200) which is partly or entirely elastic. The invention must also allow the brush head (200) to be disengaged from the elongated handle (100). This can be achieved by the cavity (203a) having the exact shape conforming to the handle head (100) or by the cavity (203a) slightly under sized. Slightly undersized cavity (203a) is composed of elastic parts that are slight undersized, not the rigid parts, so that these elastic parts will be slightly stretched when the handle head (110) is completely inserted into the cavity (203a). In this way the casing (203) of the brush head (200) will grip on to the handle head (110).

In all the embodiments of the brush head (200), preferably the interior surfaces (203b) of the casing (203) may or may not thinner in height to the shape of the handle head (110). In other words, cavity (203a) formed by the interior surface (203b) of the casing (203) would be in the shape of the handle head (110). In the presence of water as a lubricating medium, the handle head (110) can be easily inserted into the brush head (200). The elastic material of the brush head (200) will then squeeze out the water and air in between the surfaces (114) of the handle head (110) and the interior surfaces (203b) of the casing (203). When there is no air, the two surfaces would be held together by a suction force, just as in two similar wet plastic cups that are stacked together is difficult to separate. This feature further enhance the engaging of the brush head (200) on to the handle head (110). While for the thicker handle head (110), it will cause gripping tension of the elastic base (204) to enhance better holding onto the interior surfaces (203b) of the casing (203).

Additional locking means may also be included in the invention to further ensure that brush head (200) is secured on to the handle head (110) without use of any tools and would not come out accidentally during brushing. Furthermore, the locking means must allow the brush head to be removed at user's will without use of any tools. All the locking means described as follow can be applied in all the embodiments of a partly or entirely elastic brush head (200) that were described above.

The first embodiment of the locking means (300) as shown in figure 9, is a pair of extended pin (301) located on the handle head (110) and its matching hole (302) on the brush head (200). The location of the hole (302) may be anywhere on the brush head (200) as long as it is not obstructive. The extended pin (302) on the handle head (110) would then be appropriately located on the handle head (110) so that when the entire handle head (110) is inserted into the cavity (203a) of the casing (203), the extended pin (301) would snapped into the hole (302). Preferably, the extended pin (301) would be located on the first end (210) of the handle head (110) adjacent to where the last portion (103') of the neck (103) is, and the material of this extended pin (301) would be the same as the elongated handle (100). Meanwhile, the hole (302) would be on the bristle pad (201) in such a manner that the hole (302) would be near the second end (207) of the brush head (200). There may be more than one pair of extended pin and hole in this first embodiment of the locking means (300).

The engaging and disengaging to the brush head (200) is as follow. The brush head (200) is engaged on the elongated handle (100) by inserting the streamlined handle head (110) into the access (210a) or opening (209a) on the brush head (200). As the handle head (110) is inserted into the brush head (200), the handle (100) is rocked from side to side to help the handle head (110) slips completely into place. The handle head (110) will locked in position by easy alignment of extended pin (301) and corresponding hole (302) in the bristle pad (201). The extended pin (301) will snapped into the hole (302) when the corresponding area on the casing (203) is pressed by user. The brush head (200) is disengaged from the elongated handle (100) by reversing the engaging procedure.

In the second embodiment of locking means (400) as shown in figure 10, one or more extended pins (401a, 401b, 401c) are located on the top side (201a) of the bristle pad (201), that is within the cavity (203a) itself. In Fig. 10, the bristles (202) and the casing (203) are removed so as to bare the bristle pad (201). The matching holes (402a, 402b, 402c) would be

located on the handle head (110). The holes (402a, 402b, 402c) on the handle head (110) may be blind or through-hole but it is preferably through-holes. This brush head (200) with second locking means (400) is engaged to and disengaged from the elongated handle (100) in the same procedure as with the earlier brush head (200) using the first locking means (300). With
5 the second locking means (400), the brush head (200) may be engaged to the elongated handle (100) with its bristle (202) facing upward or downward since the handle head (110) is symmetrical about its centre.

The invention (000) is also meant to be a gum massager since part of the casing (203) is made
10 of soft material. It is preferable that the base portion (204), the first end wall (209) and the second end wall (207a) and the opposing side walls (205a, 205b) of the casing (203) be made of soft material for the invention (000) to function as a gum massager as well. Furthermore as a gum massager the exterior surface (203c) of the casing (203) may be textured, i.e. that is having uneven patterns. Permanent drawings may also be printed on the exterior surface
15 (203c) of the casing (203) to make the toothbrush looks more attractive.

The partially or fully elastic brush head (200) can also be incorporated in an electrical toothbrush with suitable modification to the handle of the electrical toothbrush so that brush head (200) may engaged on to and disengaged from the electrical toothbrush as described
20 above.

It is clear by now that the invention (000) is an embodiment of elongated handle (100) which may have various embodiments, and brush head (200) with various embodiments of its casing (203) or locking means (300, 400). Therefore the above descriptions of the invention are by
25 no means exhaustive and the invention may be reproduced or modified by any person skilled in the art without departing from the spirit and scope of the invention which is claimed as follows.

Claims

1. A toothbrush comprising:
an elongated handle with handle grip on first end joined to handle head on second end via
5 neck of said elongated handle; and
a brush head having a bristle pad with array of bristles projecting from bottom side of said
bristle pad and an elastic casing with its access disposed on top side of said bristle pad,
characterized by said elongated handle being engaged with said brush head by means of
inserting the handle head into the casing through its access, said access is at least one through
10 hole, and said elongated handle can be disengaged from the brush head after engagement of
the brush head with the elongated handle by the handle head taken out of said through hole of
the access, said brush head secured to said handle head by a locking means, said locking
means is a toolless locking means formed by at least one pair of fitting extended pin and
through hole, where said extended pin is located on said handle head and said through hole
15 on said brush head, and location of said extended pin and said through hole must be in such a
manner that said extended pin will securely fit in said through hole after said handle head has
been fully inserted into said brush head.
2. The toothbrush as claimed in claim 1, wherein said casing is formed by a base portion,
20 opposing side walls and a bristle pad, where said base portion is joined to said bristle pad by
means of said opposing side walls.
3. The toothbrush as claimed in claim 2, wherein said casing having an opening to a cavity
25 of said casing is located at first end of said brush head, where said cavity is defined by
interior surfaces of said base portion, said opposing side walls and top side of said bristle pad.
4. The toothbrush as claimed in claim 1, wherein said brush head has its second end
enclosed by a second end wall which is joined to both of said bristle pad and said base
portion to form part of said casing.
- 30 5. The toothbrush as claimed in claim 4, wherein a first end wall opposing second end wall,
having said opening is joined to said base portion and said bristle pad to form part of said
casing, where first embodiment of said base portion and said second end wall are made of
elastic material.

6. The toothbrush as claimed in claim 5, wherein said opening having the shape corresponds to cross-section of said neck of said handle when said handle head is fully inserted into said casing.
- 5 7. The toothbrush as claimed in any claim 1 to 5, wherein said opposing side walls and first end wall are made of said elastic material.
- 10 8. The toothbrush as claimed in claim 3, wherein said cavity is also defined by interior surfaces of both first end wall and second end wall where the second embodiment shape of said cavity conforms to shape of said handle head or said cavity having its thickness slightly thinner than the thickness of said handle head, so that said brush head encloses said handle head entirely except the part where said neck leads out of said brush head.
- 15 9. The toothbrush as claimed in any of claims 1 to 8, wherein said toothbrush having adhesion and suction force that holds said brush head and said handle head together when there is no air in between surfaces of said handle head and surfaces of said cavity.
- 20 10. The toothbrush as claimed in any of claims 1 to 8, wherein said toothbrush having thicker handle head than the height of said cavity will cause gripping tension of the elastic base to enhance better holding onto the interior surfaces of the casing.
- 25 11. The toothbrush as claimed in any of claims 1 to 10, wherein said brush head can be formed with its exterior surfaces of said base portion, said opposing side walls and second end wall have textured surfaces in order that they act as a gum massager.
12. The toothbrush as claimed in any of claims 1 and 11, wherein said elastic material enables permanent drawings to be imprinted, formed or molded on said casing.
- 30 13. The toothbrush as claimed in claim 12, wherein said elastic material is an elastomeric material such as (Thermo Plastic Elastomer) TPE resin and said bristle pad is made of rigid material such as polypropylene or any other cohesive materials that is suitable for planting or tufting arrays of bristles and said elastic material and said rigid material are easily cohered to form said brush head.

14. The toothbrush as claimed in claim 1 to 13, wherein said neck of said handle can be in the shapes of laterally at an angle to one side so that said brush head is at an angle to said handle grip when the toothbrush is viewed with end-on of said bristles in view; at an angle to one
5 side so that said brush head is at a larger angle to said handle grip when the toothbrush is viewed with side-on of said bristles in view; or any other different angles to cater for different modular handles for different brushing needs.

15. The toothbrush as claimed in claim 1, wherein said handle head of said toothbrush is flat,
10 streamlined, symmetrical about its centre and thicker or equivalent in height to the cavity of said casing.

16. The toothbrush as claimed in claim 1, wherein said extended pin and hole of the pair of
15 locking means can be in any suitable shapes to secure said brush head to said elongated handle.